

## ESTIMATION OF THE NATURE MANAGEMENT SUSTAINABILITY

### ESTIMAREA DURABILITĂȚII MANAGEMENTULUI NATURAL

Natalya G. STEPANKO<sup>1</sup>

**Abstract:** Based on the methodological concepts of nature management, regional nature management and sustainable development, an approach to the estimation of the nature management sustainability in Primorsky Krai as a typical representative of the regions related to resources is considered.

**Key-words:** sustainable development, sustainable nature management, production-natural relations.

**Cuvinte cheie:** dezvoltare durabilă, gestionarea durabilă a naturii, relații producție-natural.

#### INTRODUCTION

Developments and estimations performed at the regional level are of great value. Accounting of diversity and peculiarities of the natural systems in the environmental management planning and practices becomes possible only at regional level (Baklanov and Karakin, 2002). A mesolevel is base for investigations because it allows to acquire an information of the natural-resource potential, its use, forms and directions of the action on the territorial natural-resources systems and production-natural relations (Baklanov and Karakin, 2002). In the Ecological doctrine of the Russian Federation, a necessity to improve the mechanism of environmental expertise and strengthening its role in the estimation of impact on the environment.

#### METHODOLOGY

V.I. Danilov-Danilyan supposes to mean by the sustainable development such a course of human events which does not destroy the natural base of this development, i.e. the environment suited for the human existence is reproduced and sufficient resource base is maintained (Danilov-Danilyan, 1977). In I.P. Glazyrina's opinion, the sustainable development is one that does not result in reduction in the natural capital (Glazyrina, 2005). A study of the sustainable

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<sup>1</sup> Pacific Institute of Geography, Far Eastern Branch, Russian Academy of Sciences, Vladivostok, Russia,  
e-mail: sn@tig.dvo.ru

development at the regional level is characterized by certain specificity. So, in V.A. Koptug's opinion, one can take into account the specific, regional peculiarities, priorities and shortcomings when determining the premises and prospects of the sustainable development (Koptug et al., 1997). I.M. Aleksandrovich points also to a necessity of investigating "...the exchange processes between the Society and Nature at the regional level" where the sustainable innovative regional development is one of the most significant ecological imperatives (Aleksandrovich, 2003). Within the framework of the sustainable development, the sustainable nature management is the recognition of the equal significance of two characteristics – anthropocentric and biospherecentric – and their interdependence. "Organization of economical activity not destroying the biosphere but keeping it, i.e. a creation of the biosphere-compatible economy non-going beyond the environmental capacity of the ecosystems is one of the central tasks of the establishing the future «sustainable» society" (Moiseev, 1995). Therefore, the sustainable nature management is the use of the natural diversity components that does not result in its depletion. In speaking of the nature management sustainability, we imply the inexhaustibility, environmental opportuneness of this process. And if sustainability implies a lack of detrimental effect on the environment then, according to our reckoning, one can suggest sustainability of the nature management.

When evaluating the nature management for regions of the resource orientation, the resource conception of the production-natural relations which are an essence of nature management is most acceptable and objective. Its essence lies in the fact that, as a result of economical activity on certain territory, there are not only immediate withdrawal and use of natural resources but also their qualitative and quantitative transformation as a consequence of waste discharge into the environment (Baklanov, 1979).

In opinion of many researchers, the nature management includes the practical activities related to immediate use of the natural resources and conditions of the territorial complexes or to action on them which consists not only in involvement of these resources and conditions in the economically efficient production but also provides for their restoration and transformation (Mikhailov, 1980; Rodoman, 1978; Shiroky, 2008; and others). Therefore, the estimate of influence of the territorial-operating structure on the natural environment or production-natural relations can be divided into four components: 1. estimating of resources consumption; 2. estimating of rationality (or sustainability) of nature management (water and air contamination, land disturbance); 3. determining the ratio in the "disturbed-restored" system of the region; 4. integral estimating of the territory's ecological state as a result of the existing nature management.

## **DATA AND METHODS**

An analysis carried out on the Primorsky Krai territory showed that, after the major recession in the extraction of resources, its rise is observed since 2000 but a

share of resources exportation exceeds that of domestic processing. Within the framework of the identified groups of the territorial natural-resources carcass of Primorsky Krai, the natural resources of the first and second groups which are attributed to territories of the high provision with natural-resource potential, territorial natural-resources centre are extensively developed and determine the basic industry-specific development (Stepanko and Tkachenko, 2010). At the same time, such kinds of resources in this group as mineral waters and therapeutic muds belonging to the recreational potential are insufficiently used due to low development of tourism including recreational one. In recent times, the use of biological and non-wood forest resources is increasing, however, a degree of their use is inconsistent with the overall potential value. The remaining kinds of resources of Primorsky Krai are used in proportion to value of their relative natural-resources potential (NRP). Therefore, the existing unfavorable environmental situation in Primorye is largely related to the impact of industrial production that should (and can) be estimated using the land disturbance extent ( $K_{land}$  = area of disturbed lands/total area of lands), water contamination extent ( $K_{water}$  = volume of contaminated waste water/volume of waste water), air contamination extent ( $K_{air}$ =volume of contaminated air emissions (discharges)/volume of air emissions while an average coefficient ( $K_{aver}$ ) can be considered as the sustainability of nature management in towns and districts of the Krai.

The objectivity of such approach is confirmed by investigations of other researchers. D.V. Shiroky, for example, believes that "...from theoretical point of view, it is necessary for sustainable development that increment rates in the anthropogenic load were equal to zero" which assumes the parity of the levels of anthropogenic impact and measures for its decrease (Shiroky, 2008). Taking into account the territorial-economic reformations occurred in Primorsky Krai (Moshkov, 2008), we obtained the indices characterizing the sustainability of the existent nature management in the areas with similar industrial specialization. Within the framework of identified groups, both individual components of the nature management and nature management as whole are calculated as follows:

$$K_{aver} = 1/n (K_{land} + K_{water} + K_{air} + \dots K_n).$$

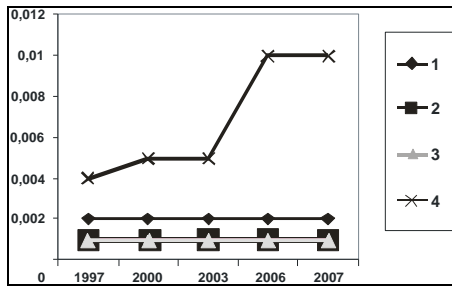
In what connection, the higher is  $K_{aver}$  value, the less rational is nature management and the worse is the ecological state of the territory under consideration. By way of examples, some graphical illustrations of estimated indices are presented below in Figures 1-3.

## RESULTS

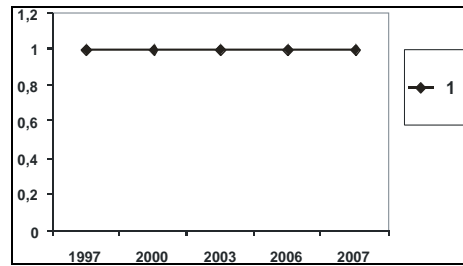
The ecological state of territory as one of the economy limitations by total contamination per capita a year can be classified as follows: "no limit" (NL), "partially limited" (PL) and "limited" (L). The above gradation is only approximately and its further correction is possible. Among indices used in the estimation of the ecological state and affecting the general environment condition are air contamination per capita; water contamination per capita and total

contamination per capita (Natural resources and environment protection in Primorsky Krai, 2010).

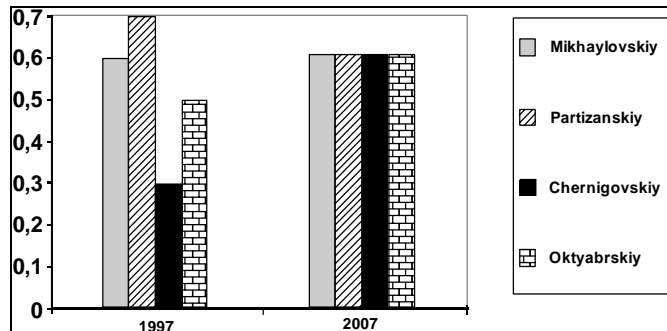
The analysis of the obtained results allowed us to determine a pattern of the environmental state of the Primorye administrative districts territories. The studies showed that the changes in the impact of the industrial production have happened but not everywhere in the same degree and not everywhere to the best.



**Fig. 1. Extraction and processing of mineral raw materials – Degree of land disturbance (K<sub>land</sub>)** Administrative districts: 1-Dalnegorsky, 2-Kavalerovsky, 3-Krasnoarmeisky, 4-Khorolsky



**Fig. 2. Building industry - Degree of atmosphere contamination (K<sub>air</sub>)**  
Administrative districts: 1-Spassky



**Fig. 3. Coal production**

A considerable improvement in the environmental situation took place in Dalnegorsky and Ussuriisky districts and lesser changes were observed in Kirovsky, Lesozavodsky and Nadezhdinsky districts. Deterioration occurred in Anuchinsky, Oktyabrsky, Pogranichny, Khorolsky, Shkotovsky and Khankaisky districts while a situation worsened to a considerable extent in Kavalerovsky, Terneisky, Chernigovskiy, Olginsky and Spassky districts. This is explained by the specificity of the territorial-sectorial reconstruction taking place in the districts, environmental protection policy as well as the structure of investments in the environment protection and sustainable nature management.

An unfavorable ecological state is largely caused by the contamination of water and air. This is explained by the fact that existent treatment facilities

(centralized and within the enterprises) were technically out of fashion while, in some districts Kirovsky, Krasnoarmeisky, Lazovsky districts etc.), a treatment is not made at all. Thus, in some districts, the complete limitation should be introduced while the rest of territory was approximately divided into two halves (Fig. 4).

It should be noted that, though Pozharsky district is fully attributed to category L (by all parameters considered), only western part adjacent to the urban-type settlement of Luchegorsk where the coal mining industry and energetic are concentrated must be considered.

To category of the partial and complete limitation, those territories were attributed where the extractive enterprises as well as enterprises for production and distribution of electric power, gas and water are of great importance. In spite of the structural changes in the territorial-economic formations, the components of the production-natural relations remain constantly low: dynamics of tendencies of these processes for a period of 1997-2007 has changed insignificantly or has not changed at all in the most districts of Primorye whereas a situation in some districts became worse.

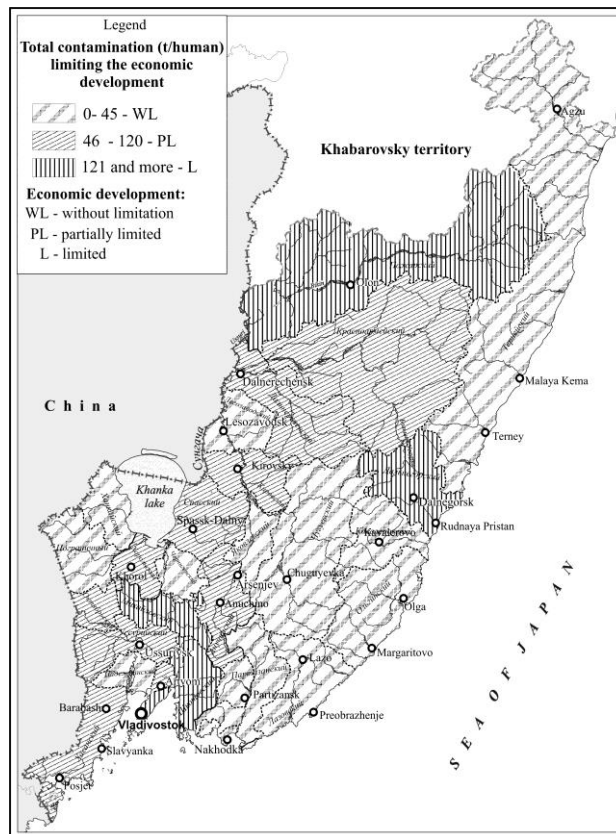


Fig. 4. Environmental state of the Primorsky Krai territory (2007)

## CONCLUSIONS

The proposed way of the nature management sustainability estimation allows to evaluate the ecological state of territory formed by the territorial-economic structure, to reveal the causes, to determine the limitation degree and lines of the further development from the viewpoint of balance of the ecologo-economic interests based on available information. The study carried out on the Primorsky Krai territory allowed to identify the districts in which the further development of the existent territorial-economic structure is limited, partially limited, i.e. possible in case of carrying out the necessary environmental protection measures and technical reconstructions and districts quite successful from the environmental point of view. This makes possible to determine the “trouble spots” and to work out a strategy of the further economic development with due account of environmental factors.

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